

Functional Area 5.4

UTILITY SYSTEMS OPERATION AND MAINTENANCE

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List of Technical Exhibits

<u>Exhibit Number</u>	<u>Title</u>
5.4-001	Contract Data Requirement Lists (CDRLs)
5.4-002	Required Scheduled Tasks
5.4-003	High Voltage and Electrical Distribution Systems
5.4-004	Maintenance Requirements on Engine Generators
5.4-005	Map of Critical Valves

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Functional Area 5.4

UTILITY SYSTEMS OPERATION AND MAINTENANCE

5.4.1 INTRODUCTION

The Contractor shall perform maintenance and repair of the water distribution systems, wastewater and stormwater collection systems, high voltage systems, fuel distribution systems, natural gas systems, dual temperature pipes, underground steam pipes (copper, steel, and FRP), and associated structures and appurtenances at Fort Lee. The Contractor shall perform services as required herein to provide complete maintenance of utility systems. All work shall be performed by qualified personnel in accordance with applicable laws, regulations, and Government developed annual and long range plans. Technical Exhibits provide expanded information for this Functional Area.

5.4.2 SCOPE OF SERVICES

5.4.2.1 Work Area/System Description

Utility systems to be maintained under this contract are highlighted in the maps provided in Technical Exhibit 1-003. The Contractor shall be responsible for the maintenance of the 16" water main that runs approximately 12 miles beyond Fort Lee toward Hopewell and the 16" water main that runs approximately 8 miles beyond Fort Lee toward Petersburg. The water treatment facilities at Fort Lee are classified as consecutive secondary treatment facilities. The operation and maintenance of these treatment facilities and all associated distribution lines, pumps, valves, other equipment and components, shall be the responsibility of the Contractor. The Contractor shall also be responsible for the maintenance of the main electrical switching station as well as all utilities located on properties owned by Fort Lee to include training areas and ranges. The Contractor is responsible for the location and marking of the utilities under the Miss Utility Law.

5.4.2.1.1 Potable Water Storage and Distribution Systems. The potable water distribution system includes, but is not limited to, water mains, water storage tanks, lift stations, fire hydrants, shut-off valves, pressure reducing valves, backflow assemblies, meters, and water reservoirs. The Contractor is responsible for maintaining and repairing the entire potable water distribution system, which includes the 16" water mains to Hopewell and Petersburg and all system components that are located up to and within the Petersburg National Battlefield, which is owned by the National Park Service. The Contractor's responsibility, with respect to the battlefield, ends at the meter servicing this facility. The Contractor shall maintain the operating permit for the potable water system and shall submit all change requests through the COR to the Virginia Department of Health, Department of Water Quality.

5.4.2.1.2 Wastewater Collection System. The Contractor shall be responsible for the maintenance of the wastewater collection system which includes: all domestic and industrial wastewater collection systems, treatment and disposal systems, and associated equipment such as, gravity sewers, manholes, force mains, septic tanks, and lift stations.

5.4.2.1.3 Stormwater Collection System. The stormwater collection system includes, but is not limited to, culverts, grates, catch basin inlets, manholes, outlets, oil/water separators, swales, gutters, channels, terraces, underground pipe and conduits, inlets, junction structures, drop structures, chutes, energy dissipaters, erosion control structures and storm sewers. The Contractor is responsible for maintaining and repairing the stormwater collection system, including the portion that runs under the Petersburg National Battlefield up to the head wall in the park.

5.4.2.1.4 High Voltage and Electric Distribution Systems. The Contractor shall be responsible for the high voltage and electric distribution systems which includes, but are not limited to, one switching station, power circuit breakers rated above 600 volts, circuit breakers rated below 600 volts, protective relays, vacuum operated break switches, voltage regulators, knife switches, batteries and battery chargers, towers, transformers, capacitor banks, street lighting systems, control systems, underground and overhead power lines, high voltage circuit switches and electric meters.

5.4.2.1.5 Fuel Storage and Distribution Systems. The fuel distribution system includes, but is not limited to, fuel distribution lines and underground and aboveground fuel storage tanks. The Contractor is responsible for maintaining and repairing the fuel distribution system.

5.4.2.1.6 Natural Gas Distribution Systems. The natural gas system includes, but is not limited to, gas distribution lines (both steel and plastic mains and laterals, IPS and CTS), gas meters, valves, substations, and regulators. The Contractor is responsible for the safe operation, maintenance and repair of the natural gas distribution system from the main meter point throughout the Installation and properties extending beyond the fence line into the training areas and ranges. The Contractor is also responsible for the inspection, maintenance, and repair of the cathodic protection system.

5.4.2.2 Work Management and Control

5.4.2.2.1 Reporting Requirements. The Contractor shall prepare, submit and maintain all records, reports, and submittals as specified herein and in accordance with the Contract Data Requirements Lists (CDRLs) in Technical Exhibit 5.4-001.

5.4.2.2.2 Publications and Forms. Specific publications and forms required for the accomplishment of work described in this Functional Area are listed in Section C-6.

5.4.2.2.3 Compliance. While performing any work on utility systems, the Contractor shall comply with all applicable Federal, State, and local laws, Army regulations, standard industry codes and manufacturer's recommendations.

5.4.2.2.4 Backflow Prevention Program. The Contractor shall develop and implement a comprehensive cross-connection control and backflow prevention program in accordance with American Water Works Association (AWWA), Federal, State, local and Code Compliance regulations. The program shall, at minimum, prevent connection between potable and non-potable water systems and assure approved protective devices are operational to prevent backflow between systems. The Contractor shall perform initial surveys of new facilities being added to the building inventory at Fort Lee to ensure that the proper and approved type of backflow prevention devices were installed and meet AWWA, EPA, State and local compliance codes. The Contractor shall maintain documentation of all records and make them available for Government inspection within one hour of being notified. The Contractor

shall maintain accurate as-built drawings of new and modified installations with regard to backflow prevention devices. The Contractor shall maintain records of the required quarterly meetings and ensure these records are available for inspection within one hour of being notified by the Virginia Department of Health, EPA, or local authorities (CDRL 504R001). The Program shall be submitted within 60 days of contract commencement and provide a systematic approach to accomplishing plumbing work in the first year of the contract (CDRL 504R002).

5.4.3 SCHEDULED TASKS

The Contractor shall perform the tasks described below on a recurring or scheduled basis and record the work under approved Standing Operating Orders (SOOs). Preventive maintenance and other scheduled task frequencies that apply to this Functional Area are presented in Technical Exhibit 5.4-002. Lists of installed serviceable equipment located at Fort Lee and its properties are provided in Technical Exhibits 5-001, 5-002, and 5-003.

5.4.3.1 Water Testing and Treatment

The Contractor shall obtain water samples and conduct the appropriate and required testing of these samples, record data, and submit reports as required to the appropriate officials for forwarding to the Department of Health within the deadline set by the State (CDRL 504R003). The Contractor shall submit the monthly water report to the Virginia Department of Health by the 10th of each month (CDRL 504R004). If samples tested show abnormalities, the Contractor shall take immediate corrective action and notify the COR of the abnormalities and the corrective action being taken. The Government will furnish a 1000 s.f. water testing laboratory where non-record samples may be analyzed. The Contractor shall submit a Sampling Plan on an annual basis (CDRL 504R005) that is required by the Virginia Department of Health. The Contractor shall submit copies of the Sampling Plans and an annual chemical and reagent inventory to the Environmental Management Office.

5.4.3.1.1 Daily Sampling. The Contractor shall collect 15 non-record water samples each day, 7 days per week: 1 sample from each of the 2 pumping stations, 1 sample from each of the 4 elevated water towers, 6 samples from other locations on Post, and 3 samples from locations in family housing areas in accordance with the submitted State approved Sampling Plan. All sampling points are drawn from dedicated sampling stations installed throughout the potable water distribution system and must be shown and approved on the Sampling Plan. The Contractor shall conduct analyses of these samples and record the following data: date, location, sample number, pH, Free Active Chlorine (FAC), volume filtered, time, initials, and results (positive or negative). The Contractor shall take immediate and appropriate action on all positive results. The Contractor shall submit a daily water quality report to the COR on all test results (CDRL 504R006). These results shall be maintained as required by the Virginia Department of Health, Department of Water Quality for a minimum of 6 years.

5.4.3.1.2 Sampling for Virginia Department of Health, Department of Water Quality.

5.4.3.1.2.1 Water Quality Testing. From the daily samples, the Contractor shall send 10 samples per month (drawing samples from each Monday of the month) to an independent certified lab and the results of which are sent to the Virginia Department of Health, Department of Water Quality for Record Samples. All

reported positive samples shall require immediate and appropriate action and resampling as required by the Virginia Department of Health, Department of Water Quality with a minimum of 3 samples (1 from the original location, 1 from upstream and 1 from down stream) in accordance with the approved Sampling Plan. The Contractor shall submit the required monthly report to the Virginia Department of Health within the time frame set by the Department (CDRL 504R007). These results and records shall be kept on file for a minimum of 6 years. These records may be kept as a hard copy or a on a computer disc and are subject to State, Federal, and EPA inspection.

5.4.3.1.2.2 Trihalomethanes (THM) Testing. From the daily samples, the Contractor shall submit 5 samples per quarter to an independent certified lab for testing of trihalomethanes (THMs), and the results of which are sent to the Virginia Department of Health, Department of Water Quality as record THM samples. All positive samples require immediate and appropriate action and resampling as required by the Virginia Department of Health, Department of Water Quality in accordance with the approved Sampling Plan. The Contractor shall submit a quarterly Record Sample THMs Report to the Virginia Department of Health, Department of Water Quality (CDRL 504R008). The Contractor shall be responsible for maintaining the records for a minimum of 6 years. The records may be kept as a hard copy or on a computer disc and are subject to State, Federal, and EPA inspection.

5.4.3.1.3 Bacteria Testing. From the daily samples, the Contractor shall analyze 10 samples per month for bacteria as non-record samples and record the results in a logbook. The tests require the following data: date, time, location, results, and initials of person who performed the tests. The results of the non-record samples shall be kept on file for a minimum of 6 years. The test results and logbook are subject to inspection from State and Federal agencies. It is a violation for logbook to have any removed pages. Any mistakes made in this logbook shall be lined through and initialized.

5.4.3.1.4 Testing of Swimming Pools. The Contractor shall take physical samples of 1 indoor pool and 4 outdoor pools (during the season, Memorial Day to Labor Day) a minimum of one time daily to test for pH, calcium, bacteria, and chlorine levels, etc. The Contractor shall document all chemical tests in a log and provide copies weekly to Preventive Medicine. The Contractor shall replenish the pool with the approved appropriate chemicals (calcium, chlorine, baking soda, etc.) to maintain proper water quality. The Contractor shall be responsible for the storage, delivery, and the ordering of the chemicals.

5.4.3.1.4.1 Indoor Pool. The Contractor shall annually clean, paint, and patch the pool during the summer. This shutdown for cleaning and maintenance shall be scheduled and the Contractor shall notify the appropriate personnel.

5.4.3.1.4.2 Outdoor Pools. The Contractor shall annually clean, paint, and patch the pool during the off season (between Labor Day and Memorial Day).

5.4.3.2 Water Distribution Systems

The Contractor shall maintain, repair, replace, install, inspect, remove, and modify the potable water distribution system to provide clean and safe potable water in adequate

quantities and pressures for domestic use, fire protection, recreation, irrigation, and training purposes. Whenever work on the potable water system is performed, the Contractor shall employ an approved Virginia Department of Health, Water Quality Standards disinfecting method in accordance with AWWA C 651-92 and C 652-92. The Contractor shall be subject to inspections with prior notification or unannounced inspections of the treatment facilities, laboratory, water towers, reservoir, records, reports, equipment, and components of the potable water system. These inspections will be conducted by the Department of Water Quality, Virginia Department of Health at least once per year. Inspections may also be conducted by EPA.

5.4.3.2.1 Water Mains. The Contractor shall perform a quarterly inspection of the 16" water main that runs approximately 12 miles beyond Fort Lee towards Hopewell and the 16" water main that runs approximately 8 miles beyond Fort Lee towards Petersburg. In the event that maintenance or repair is required, the Contractor shall coordinate such activities with the respective city.

5.4.3.2.2 Water Storage Tanks. The Contractor shall annually inspect the storage tanks; ensure that the facility lighting system is functioning properly; repair or replace components and equipment as necessary; replace burnt-out bulbs; remove all debris; and secure facilities upon leaving. The Contractor shall perform a visual check on each standpipe riser to ensure that the structure is sound and shows no signs of leakage. The Contractor shall visually check the overflowing pipe for signs of rusting or cracking and check each storage tank's cathodic protection systems to verify that the amperage is correct. If any deficiency is noted, the Contractor shall initiate corrective action within two working days.

5.4.3.2.3 Flushing. The Contractor shall flush the water distribution lines at least once a year or as determined by daily testing and ammonia build-up. Flushing may be required as often as once per quarter with outside temperatures above 40°F; or as a result of unsatisfactory quality testing, customer complaints, or after a major line break. The Contractor may also be required to flush several hydrants in low flow areas on a daily basis as determined by the water quality tests for short time periods, not to exceed one hour. The mains shall be flushed to provide: corrosion control protection, sediment removal, taste-and-odor control or control of discolored water; high turbidity control; low chlorine residuals; or bacteriological growths. The Contractor shall submit a plan 30 days after the Contract starts for Water Distribution Flushing that shall address the areas to be worked on and a schedule for accomplishment (CDRL 504R009). The Contractor shall notify the Virginia American Water Company in Hopewell and The Appomattox Water Authority in Petersburg a minimum of 24 hours in advance to make arrangements to process additional water. The Contractor's plan shall include a utility map showing work locations. These maps and plans shall be updated to reflected the progress of the work.

5.4.3.2.3.1 Notification. The Contractor shall notify the public at least ten working days prior to routine/scheduled flushing. The Contractor shall post a notice of intended flushing activities in the Installation newspaper and through the family housing office. The Contractor shall notify the Fire Department, the Povost Marshals Office, the Service Order Desk, and Military Police prior to the start of flushing. In the event of an emergency, notification shall be provided immediately to those individuals or activities effected: water treatment plant operators; fire department; non-water utilities, such as gas, electric, cable TV, and telephone

companies, who may have underground facilities in the area of discharging; customers on dialysis; hospitals; dental clinics; Military Police; and food service providers.

5.4.3.2.4 Fire Hydrants. The Contractor shall exercise, inspect, replace, and repair fire hydrants on the Installation and in family housing areas on a quarterly basis (winter month inspection temperatures must be above 40°F). Inspection tasks include, but are not limited to, check proper operation, adjust tightness of nozzles, check for cracked barrels, inspect operating nuts and nozzle threads, lubricate operating nuts, lubricate or replace broken or stripped stems or stem nuts, paint (in accordance with the Installation color code), and repack valve stems. The Contractor shall use the Fire Department's quarterly flow test as part of the inspection. The Fire Department will notify the Service Order Desk of fire hydrants that need to be repaired or replaced.

5.4.3.2.4.1 Flushing Requirements. Hydrant flushing in the Family Housing Area shall be completed between the hours of 2200 and 0500, to cause minimal disturbance of housing residents for washing clothes, bathing, drinking, and watering. The Contractor shall not flush hydrants until approval and proper notification of the public, Fire Department, water suppliers, and Military Police. The Contractor shall use deflection devices to prevent erosion or soil damage to turf. The Contractor shall maintain constant communication with the Service Order Desk to maintain the reserve water tower level.

5.4.3.2.4.2 Out-of-Order Fire Hydrants. The Contractor shall notify the Fire Department and the COR of work that will place any fire hydrant(s) out of service and the approximate length of time the area is going to be affected. The Contractor shall keep and file the following: the time, the location(s), identification, number of fire hydrant(s), and chlorine residual readings for all flushing of dead ends. The Contractor shall make the file available to the COR upon request and shall provide the file to the COR at completion or termination of the Contract. The Contractor shall be responsible for placing an out-of-service tag on the effected hydrant(s). The tag shall not be removed until the hydrant(s) is placed back in service and the Fire Department has been notified of the status.

5.4.3.2.5 Manholes and Valve Pits. The Contractor shall annually clean out manholes, replace manhole covers, repair/replace caps, ladders, rings, and interior linings. In addition, the Contractor shall uncover those manholes covered by dirt and debris, remove grit, sand, and debris, and dispose of debris in an approved method. The Contractor shall abide by these provisions in the event of heavy rains or other similar circumstances. The Contractor shall make the entry into these manholes and valve pits in accordance with the Confined Space Entry Regulations.

5.4.3.2.6 Lift Stations. The Contractor shall inspect self-alternating pumps in lift stations from lead to lag positions on a quarterly basis to ensure even wear on all pumps.

5.4.3.2.7 Septic Tanks. The Contractor shall inspect, pump out, and clean septic tanks every five years.

5.4.3.2.8 Pump Stations. The Contractor shall inspect the pumping stations daily (seven days a week) for leaks, security, chlorine, and ammonia cylinders and weights. The Contractor shall note the visits in the log book that is maintained with the water

quality testing reports. The Contractor shall take daily meter readings, as part of the inspection, located in or near the pumping stations. The readings are recorded daily for the monthly water quality report.

5.4.3.2.8.1 Emergency Generators. The Contractor will visually inspect the emergency power generator and diesel operated pump at each pump station for fuel leaks. On a weekly basis, the Contractor shall run the emergency generators for a minimum of one hour. The Contractor shall inspect the associated equipment and components that are necessary for the proper operation of the generator (e.g. batteries, switchgear, belts, and coolant).

5.4.3.2.9 Water Towers. The Contractor shall check and inspect the altitude valves pits and pressure at each water tower daily and record the results in the monthly data log for the water quality report.

5.4.3.2.10 Distribution System Valves. The Contractor shall exercise tank valves over their entire operating range on a semi-annual basis and adjust valve positioning as necessary. Valves that fail to open or close shall be repaired to full serviceable. Critical valves shall be inspected and exercised every two years or as necessary to maintain critical valves for emergency shut off at a minimum. Technical Exhibit 5.4-005 provides a map of the critical valves. For small distribution valves, the cycle for inspection and exercising shall be once every five years at a minimum. The Contractor shall keep and maintain records on the age, size, characteristics and maintenance performed on all valves.

5.4.3.2.11 Water Service Disruption. The Contractor shall plan and coordinate all service outages with the COR for all Installation buildings or housing. The Contractor shall notify the activities affected or parties involved at least ten working days in advance of the scheduled outage. The Contractor shall notify the COR and all activities involved within one hour after an emergency outage requires discontinuation of potable water service. The Fire Department shall be notified immediately when any section of the potable water distribution system has been secured and when the system has been returned to normal service. The Contractor shall make every attempt to utilize existing loop systems and reinforced connections to minimize the impact on normal service operations. The Contractor shall provide temporary water service, where applicable, while the system is down.

5.4.3.3 Wastewater Collection Systems

The Contractor shall annually maintain the wastewater collection system which includes pipes, manholes, appurtenant structures, and building sewers. Minor repairs include; tightening loose fittings, nuts, bolts, and screws; tightening loose electrical connections; and the reinstallation of handles and knobs shall be included in the recurring maintenance check.

5.4.3.3.1 Wastewater Collection Mains. The Contractor shall make routine inspections of the wastewater collection system to maintain the integrity of the system. The Contractor shall clean and use the T.V. truck to locate and repair high problem areas.

5.4.3.3.2 Flushing System. The Contractor shall perform hydroflushing of the sewer mains on an annual basis showing the main concentration of flushing in the high trouble areas and covering at least 1/3 of the system annually. The mains shall be flushed to ensure free flow of waste matter. The Contractor shall prepare a plan for

sewer flushing which will address the areas to be worked on and a schedule for accomplishment (CDRL 504R010). The Contractor's plan shall include marked up utility maps showing work locations. These maps and plans shall be updated to reflect the progress of the work. The Contractor shall remove all foreign materials from sanitary manholes on an annual basis or as required to clear a sewer blockage. Access lids for sanitary sewers, e.g., manhole covers and bar grates, shall be maintained in place.

5.4.3.3.3 Sewer Manholes. The Contractor shall on an annual basis, inspect, maintain and repair sewer manholes including repairing/replacing caps, rings, covers, and interior linings; uncover those covered by dirt and debris and raising top to ground level; remove grit, sand and debris and dispose of the materials by an approved method or transport to a larger main. The Contractor shall chemically treat manholes on an annual basis or on as needed basis for grease build-up and root control. The Contractor shall paint manhole covers in fields and grounds, white for identification. The Contractor shall, after rodding or cleaning sewer lines, remove all waste and debris that surrounds the manhole or site area and dispose.

5.4.3.3.4 Sewage Lift Stations. The Contractor shall annually perform mechanical and electrical lift station operational checks. Operational checks include, but are not limited to: checking the shaft sleeve and packing; checking the assembly for leaks and repacking; and checking the pumps for unusual noise, vibration and overheating. The Contractor shall annually clean lift stations, and waste material removed shall be disposed of properly and in an approved manner, to include transporting to another manhole. The Contractor shall also check pumps annually for proper operation. All required preventive maintenance shall be performed and logged appropriately in accordance with manufacturer's specifications.

5.4.3.3.5 Notice of Wastewater Disruption. The Contractor shall give five working days notice (or within 15 minutes of work commencement for emergency requirements) to the COR and all affected activities when planned maintenance, inspections, or repairs are scheduled requiring an outage or disruption of service. The notification shall include the reason for the outage, if it will completely interrupt or reduce the level of service, the facilities or areas affected, the date and time, and an estimate of when normal service will resume. The Contractor shall install a bypass line for disruptions greater than four hours.

5.4.3.4 Storm Drainage Systems

The Contractor shall maintain and repair all stormwater collection systems and associated equipment. Inspections shall be made during rainy periods to determine those areas needing cleaning or repair. The Contractor shall ensure that the stormwater systems are operational at all times to prevent flooding of the streets, sidewalks, and facilities. The Contractor shall clean once every two years a minimum of 1/2 of the underground enclosed and open storm drain systems and shall rotate these areas as required to complete. All damages to road (dirt or hard surfaced) shoulders that are necessary for maintenance, repair, and cleaning of storm drainage systems shall be repaired by the Contractor within seven days. The Contractor shall utilize and comply with the Water Pollution Control Federation Manual, for safety and record keeping and shall comply with all applicable Federal, State, and Army health and Environmental Standards in performing stormwater services.

5.4.3.4.1 Storm Sewers. The Contractor shall annually remove all debris, vegetation, and sediment that has accumulated in open above ground and enclosed below ground drainage conveyances in the areas designated. Cleaning shall include, but is not limited to, the removal of sand, gravel, rocks, debris, roots, sod, grass trapped within the lines, manhole chambers, culverts, and curb catch basins.

5.4.3.4.2 Oil Separators. The Contractor shall inspect each of the stormwater/oil separators annually to obtain sufficient samples of stormwater run-off to comply with the Commonwealth of Virginia Pollution Discharge and Elimination (VPDES) permit requirements. The Contractor shall ensure that the stormwater flows freely.

5.4.3.4.2.1 Disposal. All debris and petroleum products collected by these separators shall be disposed of in accordance with appropriate hazardous waste disposal requirements. Drawings of the locations of the oil/water separators are available in the Public Works Engineering Office.

5.4.3.4.3 Corrosion Protection. The Contractor shall perform annual corrosion inspections of all stormwater equipment and related structures including, but not limited to, manholes, steel supports, steel grates, steel stairs, concrete foundations, and prefabricated structures.

5.4.3.4.4 Notice of Disruption of Service. The Contractor shall give five working days notice (or within 15 minutes of work commencement for emergency requirements) to the COR and all affected activities when planned maintenance, inspections, or repairs are scheduled requiring an outage or disruption of service. The notification shall include the reason for the outage, if it will completely interrupt or reduce the level of service, the facilities or areas affected, the date and time, and an estimate when normal service will resume.

5.4.3.5 High Voltage and Electrical Distribution Systems

The Contractor shall maintain Electrical Distribution Systems (EDS) to provide stable, reliable power to all facilities. The Contractor shall maintain electrical systems listed in Technical Exhibit 5.4-003. The Contractor shall handle all noncritical facilities in accordance with emergency, urgent or routine work, as applicable to the occasion. The Contractor shall ensure that electrical facilities are reliable, operationally efficient, and present no risk to personnel or equipment. Personnel working on energized circuits shall be required to work, at a minimum, in two-man teams, with one worker positioned to de-energize the involved circuit in the event of an accident. All circuit breakers de-energized for maintenance purposes shall have safety switches, circuit breakers, or fusebox handles mechanically secured in the OPEN position to prevent accidental energizing during maintenance procedures. Circuits wired in the OPEN position shall be posted with information such as the date, time disabled, and the Contractor's point of contact. When working in manholes or other hazardous areas involving restricted movement or the presence of incapacitating fumes or gases, one worker shall be positioned to take necessary action required for assistance.

5.4.3.5.1 Lock Out Tag Out. The Contractor shall furnish and use Lock Out Tag Out devices when performing maintenance of electrical systems. Devices shall indicate the following:

- Employee name

- Shop
- Telephone number
- Date of maintenance

5.4.3.5.2 Preventive Maintenance of High Voltage Electric System. The Contractor shall incorporate a program of Preventive Maintenance of all critical electrical equipment. This shall include, but not be limited to, the critical switching station, transformers, circuit breakers and other critical electrical equipment.

5.4.3.5.2.1 Switching Station Grounding. The Contractor shall inspect and test all switching station grounding annually for compliance with ANSI/IEEE Standard 142 - Practice for Grounding of Industrial and Commercial Power Systems. The Contractor shall inspect critical grounding following major lightning strikes to ensure functional integrity of the systems. The Contractor shall replace grounding as necessary to repair switching station grounding system to meet code requirements. This includes, but is not limited to, all grounding and connections above and below the surface.

5.4.3.5.2.2 Switching Station Inspections. The Contractor shall perform weekly inspections of the switching station located in Building 15006, to check alarm conditions and replace indicator bulbs as necessary. The Contractor shall also perform every two years a full calibration and testing of breakers in coordination with the Army Power team.

5.4.3.5.3 Corrosion Protection. The Contractor shall perform annual corrosion inspection and corrosion protection of all electrical equipment and related structures including, but is not limited to, transformers, circuit breakers, switches, switchgear, capacitor banks, steel supports, concrete foundations, prefabricated structures, security fences, and grounding.

5.4.3.5.4 Engine Generators. The Contractor shall perform a monthly inspection of each auxiliary engine generator to test for start-up and verify full load, voltage, and current. The Contractor shall note any pertinent information on the inspection performed in the Generator Testing Log Book, including the date, generator tested, time and duration of the test, load carried, condition of equipment, name of operator, and any problems encountered. Upon encountering a problem, the Contractor shall submit a service order to correct the problem. A list of engine generators to be load tested is presented in Technical Exhibit 5.4-004.

5.4.3.5.5 Electric Meters. The Contractor shall read the electric meters on the 15th of every month. The Contractor shall prepare a monthly consumption report for the COR. The Contractor shall replace, repair, and maintain KWH and KWH demand meters, ammeters, voltmeters, power face meters, and associated enclosures, instrument transformers, CT's, and PT's. Both primary (13.8 KV) and secondary (less than 750 volts) meters are included in this requirement.

5.4.3.5.6 Street and Parking Lights. The Contractor shall survey quarterly and replace bulbs, fuses, glass, and power to all the street lights on the Installation.

5.4.3.5.7 Traffic Lights. The Contractor shall check operations monthly of traffic controls and special zone lights.

- 5.4.3.5.8 Disruption of Service. The Contractor shall coordinate all scheduled outages with the COR. Such outages shall be coordinated at least ten working days in advance of the scheduled outage. The Contractor shall notify the affected Installation agencies of the scheduled outage. The Contractor shall attend, as applicable, planning meetings that may affect the power systems the Contractor maintains. The COR will notify the Contractor at least 48 hours in advance of planned meetings. The Contractor shall provide scheduled power outages for construction, maintenance, repair, engineering evaluation, and other purposes, as requested to do so. The Contractor shall re-energize the systems according to the outage schedule or request. The Contractor shall maintain a log of all scheduled outages to include the outage location (circuit #, open points), date and time de-energized and personnel involved, date and time re-energized and personnel involved, and comments.
- 5.4.3.5.9 Control Devices. The Contractor shall annually check the operation of the controls, repair or replace worn parts, and tighten any loose connections.
- 5.4.3.5.10 Transformers. The Contractor shall observe and record the ambient temperature, liquid temperature, winding temperature, load current, voltage, tank pressure gauge, and liquid level. The Contractor shall annually check for loose electrical connections, contaminated bushings, oil leaks, ground resistance, and the operation of the auxiliary cooling fans. The Contractor shall also check butyl or porcelain surfaces, bushings and grounding straps for wear, integrity, and breakage.
- 5.4.3.5.11 Relays. The Contractor shall annually clean the exterior and interior of the relay cases and covers. The Contractor shall also check the internal components and contacts.
- 5.4.3.5.12 Circuit Breakers. The Contractor shall annually check all contacts, insulation, arc chutes and cleanliness of the operating mechanism on air circuit breakers. The Contractor shall check oil levels, correct fusing, the condition of bushings and terminals, oil leaks, dents, corrosion and grounding on oil circuit breakers. The Contractor shall check the air compressor, tank, piping, valves, pressure switches, gauges, and solenoids on pneumatic systems.
- 5.4.3.5.13 Voltage Regulators. The Contractor shall annually check bushings, oil levels, gauges, cabinet gaskets, indicating lights and glass covers, main contacts, limit switch connections, and general operation of voltage regulators.
- 5.4.3.5.14 Buses. The Contractor shall annually remove grease and oil from surfaces and eliminate excessive contamination from supporting insulators.
- 5.4.3.5.15 Switchgear Equipment. The Contractor shall annually inspect buswork, primary disconnects for overheating, and the alignment and contacting of primary disconnecting devices. The Contractor shall also check relays, contractors, switches, fuses, arc chutes, breaker operating mechanism, and tightness of the breaker control wiring.
- 5.4.3.5.16 Batteries. The Contractor shall weekly check specific gravity and level of electrolyte, battery temperature, tightness of vent plugs, connector bolts, battery cleanliness and battery charge. The Contractor shall also measure open circuit voltage of cells and record this data. This data shall be maintained for three years.

5.4.3.6 Natural Gas Distribution Systems

The Contractor shall ensure that inert gas and natural gas is available, upon demand, at pressures consistent with the system design specifications for all applicable buildings and structures. The Contractor shall ensure that all components of the Natural Gas Distribution Systems are maintained in accordance with 49 CFR Part 191 and 192, TMS 5-652, TMS 5-653, and TMS 5-654. The Contractor shall maintain gas leak detection equipment in good operating condition at all times and shall respond to emergency odor complaint calls with the Fire Department or as required by proper notification to ensure the safety of the public, family housing occupants, and the workforce.

5.4.3.6.1 Gas Regulator Caps. Prior to freezing weather, the Contractor shall inspect all gas regulators, in family housing area on a semi-annual basis and for the Installation on an annual basis, to ensure regulator caps are secured tightly and may not be easily removed by children. The Contractor shall replace any missing caps during the inspection.

5.4.3.6.2 Gas Valves. The Contractor shall inspect, grease, and repair all gas valves annually for the Post, quarterly for family housing, and quarterly for the critical valves in accordance with Federal Regulation 49 CFR and Pipeline Safety Regulations 192.745 and 192.747.

5.4.3.6.3 Annual Leakage Survey. The Contractor shall conduct a leakage survey on an annual basis on all gas lines in accordance with 49 CFR 191 and 192.

5.4.4 UNSCHEDULED TASKS

The Contractor shall perform the tasks described below when initiated through either a Service Order (SO) or an approved Individual Job Order (IJO).

5.4.4.1 Utility Marking

The Contractor shall be responsible for marking underground electric, water, sewer and gas lines as required. The Contractor shall coordinate this effort through Miss Utility. The Contractor shall also be required to locate cathodic protection anode beds, valves, and other known underground structures as necessary in accordance with applicable laws, regulations, and color codes. The Contractor shall locate and mark underground utilities with spray paint or other suitable markers that are approved by the National Utilities Code of Color for Individual Underground Utilities in order to prevent damage when others are digging, installing, altering, or maintaining systems near existing underground utility systems.

5.4.4.2 Services for Other Organizations.

The Contractor shall be responsible for performing the work upon request for other civilian contractors, Military Engineering Units, the Installation Communications Command Maintenance Shop, and other organizations.

5.4.4.3 Water Distribution Systems

5.4.4.3.1 Water Mains. The Contractor shall maintain and repair all lines to ensure the integrity of the water distribution system. The Contractor shall also repair, locate new lines, pump out flooded areas, excavate (including asphalt and pavement and sidewalk removal, if necessary), backfill, and clean up all water spillage as necessary

to provide a safe environment to the public; erect barricades prior to excavating and remove them after backfilling; grading and seeding as applicable; and thaw frozen potable water lines. Repairs include, but are not limited to, repairs to service connections and distribution mains. The Contractor shall be responsible for restoring the area to its original condition after repairs, installations, or modifications are complete. The Contractor shall thaw and repair frozen lines inside of structures and facilities on the installation and repair all damage to return the affected area to the original condition.

5.4.4.3.1.1 Water Main Repair. The Contractor shall be responsible for locating water main and lateral service leaks, shutting off the water, repairing the leak, and returning water lines to a safe and serviceable condition. In the event of a water main break the Contractor shall repair, disinfect and perform the necessary microbiological water tests before reinstating the water service in accordance with AWWA Standard C 651-92. The water main and lateral service shall not be returned to service until approved by the COR. Information shall include, but not limited to: street location, indication of how the break occurred, area affected by the water outage, and the Contractor at the job site. The Contractor shall notify the affected facilities and advise the COR about the status of the water.

5.4.4.3.1.2 Excavation and Backfilling. If excavation and backfilling are required, the Contractor shall erect barricades prior to commencement of work and remove them after the work is complete. Backfilling shall be accomplished with dry sand, pea gravel or compactible dirt. The Contractor shall place components on sand or dirt compacted every 2' at 80% compaction. No gravel or rock larger than 1/2" diameter shall be allowed to contact the utility. The Contractor shall place, above the repaired utility, tracer wire and magnetic tape 6" to 12" in the backfill. Dirt from the excavation shall be removed from the area and sent to the Engineering yard, where it is to be covered with plastic and weighted down with sand bags, or disposed of at a sanitary landfill, as directed by the COR.

5.4.4.3.2 Corporation Stops and Curb Boxes. The Contractor shall: repair, replace and/or install, clean, and reset stops and boxes to ensure properly functioning stops, and accessibility to underground valves. The Contractor shall ensure that critical valves can be clearly identified for to use in emergency shut down to cause the least impact to service. The Contractor shall locate stops and boxes, decontaminate piping, flush lines, backfill, and restore to the original condition; replace or install protective concrete collars around stop boxes after repairs are made; replace missing or damaged stop box lids with appropriate type and lettered box cap for the utility being served. The Contractor shall also color code the box cap with the appropriate color of spray paint for this utility.

5.4.4.3.3 Valves and Valve Boxes. The Contractor shall: maintain complete operability of the distribution system; repair, install and/or replace valves and valve boxes to maintain integrity of the water distribution system; locate valves, shut off water, decontaminate water line, turn on water, flush water line, and restore to original condition. The water system's valves generally consist of gate and butterfly valves. Valves range from 1/2" to 16" in diameter. Repairs include, but are not limited to, valve stem packing, lubrication (using approved FDA food approved grease for domestic water service), replacement of broken, stripped stems or stem nuts, and any other work necessary to return valves to correct operating condition

5.4.4.4 Wastewater Collection Systems

The Contractor shall repair, install, maintain, replace and/or modify the wastewater systems to provide stable, reliable wastewater services to all facilities. Occasionally, the Contractor shall assist other organizations with major sewage malfunctions. The Contractor shall repair, install, replace or unclog all lines as required. In the event of spillage and/or overflow, the Contractor shall notify the Environmental Department at Fort Lee. The Contractor shall notify the COR prior to any line repair work that disrupts traffic and provide an estimate of the length of the disruption.

5.4.4.4.1 Sewer System Malfunctions. Malfunctions in the sewer system, such as stoppages or structural failures causing interruption of service, shall be traced by the Contractor to the probable cause, reported to the COR, within one hour and corrected after a notice to proceed is confirmed. Emergency sewer maintenance shall be performed on gravity mains, forced mains, septic tanks, and lift stations to free blockage and repair malfunctions. Stand-by or back-up equipment components identified for emergency use shall be operated and maintained in accordance with manufacturer instructions.

5.4.4.4.2 Lift Station Overflows. If at any time a lift station overflows to the extent that wastewater escapes from the station, the Contractor shall repair the station to eliminate the cause of the overflow, restore the station to proper operation and clean up the spill. The Contractor shall notify the Environmental Department to post signs around the area of the spill stating "DANGER. RAW WASTEWATER." until the spill has been cleaned and the station returned to operation. The Contractor shall notify the COR and the Environmental Department of any wastewater and/or sewer manhole overflow spill that may effect receiving waters through the stormwater drainage system within 15 minutes of discovery. If, at any time, a lift station and/or manhole becomes inoperable due to the need for major repairs or unavailability of a required part, the Contractor shall make the necessary arrangements and provide equipment and components to by-pass the ruptured system and pump the sewage to the nearest free flowing manhole.

5.4.4.4.3 Cleanup and Disinfection. The Contractor shall be responsible for cleaning up and disinfecting areas in which a wastewater spill has occurred. The cleanup effort shall comply with applicable references listed in Section C-6. The Contractor shall dispose of the material with the approval of the COR and the Environmental Department.

5.4.4.5 Storm Drainage Systems

The Contractor shall maintain, install, modify, and repair the storm drainage system and associated equipment

5.4.4.5.1 Stormwater Collection Main Repair. The Contractor shall repair, install, modify, or replace all stormwater collection mains to preserve the integrity of the stormwater collection system. The Contractor shall be responsible for locating stormwater collection main leaks, repairing the pipe, and returning stormwater lines to serviceable condition. The Contractor shall check the stormwater collection system during excessive rainfall to determine the problem areas.

5.4.4.5.1.1 Storm Sewers. The Contractor shall remove, install, and replace storm sewers, grates, drop inlets and covers as necessary. Any entry into a stormwater

collection system requires a Confined Space Entry Permit, in accordance with the Confined Space Entry Regulations.

5.4.4.5.1.2 Replacing Pipe. The Contractor shall repair or replace damaged, broken, collapsed, or clogged drainage pipes by reopening pipe trench and repairing or replacing damaged or worn pipes. The Contractor shall excavate pavement to gain access to storm sewers or drainage facilities where required. The backfill to the excavation shall be compacted and surfaced area returned to its original condition.

5.4.4.5.1.3 Manholes. The Contractor shall maintain and repair sewer manholes including repairing/replacing caps, ladders, rings, covers, and interior linings, uncovering those covered by dirt and debris and raising top to ground level, and removal of grit, sand and debris from manholes. The Contractor shall, after rodding or cleaning sewer lines, remove all wastes and debris that surrounds the manhole clean out area.

5.4.4.5.2 Excavation and Backfilling. If excavation and backfilling is required, the Contractor shall erect barricades prior to commencement of work and remove them after the work is complete. Backfilling shall be done with dry sand or compactible dirt and placing components on sand or dirt compacted every 2' at 80% compaction. No gravel or rock larger than 1/2" diameter shall be allowed to contact utilities. The Contractor shall dispose of waste from excavation at the sanitary landfill or as directed by the COR. The Contractor shall restore the area to its original condition.

5.4.4.5.3 Catch Basins. The Contractor shall clean catch basins, drop inlets, open flumes, manholes, and similar structures based on rate of silting or clogging with debris in order to ensure proper runoff. When entry into a structure is necessary, the Contractor shall comply with the Confined Space Entry Regulations. The Contractor shall maintain headwalls to prevent erosion or scour of the embankment adjacent to culvert inlets or outlets. No catch basin shall remain out of service longer than seven calendar days.

5.4.4.6 High Voltage Systems

5.4.4.6.1 Outage Reports. The Contractor shall prepare a written outage report for each unscheduled power outage on the high voltage system (CDRL 504R011). These reports shall be submitted to the COR Representative within 8 working hours of the restoration of power. Items to be included on the outage reports include those below. Additional items may be required by the government, or reported by the Contractor, if deemed necessary.

- Date of Report
- Author of report
- Date of Outage
- Approximate time of outage
- Approximate time power was restored
- Contractor employees responding to the outage

- Government employees on site at the outage.
- Location of fault (identify circuit and approximate area of coverage, protective devices involved: cutouts, switch, recloser, circuit breaker)
- Fuses replaced/recloser or breaker reset; if protective device values/parameters are changed with replacement or resetting, specify new values. Specify values of fuses replaced regardless.
- Cause of fault; indicate whether probable or verified.
- Comments/Remarks/Suggestions

5.4.4.6.2 Distribution Lines and Power Manholes. The Contractor shall perform all repairs to the existing EDS power lines and to all wiring supporting street and perimeter lighting as required. The Contractor shall perform repairs to power manholes within the existing distribution systems and perform repairs to manholes and vaults servicing the underground cable system. Where feasible, the Contractor shall repair, maintain and modify the drainage of the distribution system, including but not limited to all manholes, handholes, ductbank, drains, sump pumps, weepholes, and covers in order to maintain a clean, well-ventilated, and moisture-free environment (when possible) to reduce corrosion of electrical connectors. The Contractor shall be certified for Confined Spaces.

5.4.4.6.3 Exterior Lighting. The Contractor shall repair the exterior lighting system as required. The exterior lighting system includes walkway, street, and parking lot lighting; area lighting, perimeter and security lighting; windsocks and lights around windsocks; helipad lighting; and encompasses bases, poles, fixtures, and controls. Cleaning of light fixtures shall coincide with relamping.

5.4.4.6.3.1 Traffic and Street Lighting. The Contractor shall repair, replace, install, maintain, and test all traffic and street lighting systems on a service order basis in accordance with the National Electric Code Manual and operation manuals.

5.4.4.6.3.2 Helipad Lighting. The Contractor shall repair, replace, install, and maintain runway approach and obstruction lights.

5.4.4.6.3.3 Power Failure. In the event of a power failure, the Contractor shall check substations to confirm loss of power condition (total power failure, partial power failure, or single phase condition) and backup generators shall be checked for proper operation.

5.4.4.6.4 Emergency Engine Generators. The Contractor shall maintain and repair emergency engine generators. AR 420-43 requires that maintenance schedules published in TM 5-811-3 and TM 5-684 shall be complied with by the Contractor. The Contractor shall comply with all such mandatory maintenance schedules. In addition, AR 420-43 specifies special schedule requirements for auxiliary equipment used in certain applications.

5.4.4.6.5 Electric System Monitoring. The Contractor shall ensure proper monitoring, functioning, and reporting of the electric system. The Contractor shall determine the most cost effective method of monitoring the system.

5.4.4.7 Fuel Distribution Systems

The Contractor shall repair, locate, modify, or replace all lines associated with the fuel distribution system in accordance with 49 CFR Part 191-192

5.4.4.7.1 Fuel Distribution. The Contractor shall respond to all fuel leaks in accordance with Priority I work. Fuel leaks are defined as those leaks causing evacuation of facilities and the Fire Department and Environmental Department respond and all compliant calls. The Contractor shall notify the Fire Department by telephone and/or radio, within 5 minutes after the Contractor has discovered or notification that there is a fuel leak for any of the underground storage tanks.

5.4.4.7.2 Fuel Contingency Plan. The Contractor shall develop a Fuel Oil Contingency Plan (CDRL 504R012) within 60 days of the contract commencement. The Contractor shall provide guidance for allocation of fuel oil should an interruption of supply occur. The Contractor shall perform all applicable tasks listed in the plan in the event of an emergency.

5.4.4.8 Natural Gas Distribution Systems

The Contractor shall respond to all gas leaks and/or order complaints in accordance with Priority I work. All gas leaks are defined as those leaks causing customer complaint of an odor and evacuation of facilities; leaks caused by broken or ruptured piping, valves, or gaskets that produce a strong odor of gas, and any other gas leaks determined to be Priority I work by the Installation Fire Marshal, the COR, the customer, and/or any person that suspects or smells what is believed to be a gas leak, inside and outside of structures, along roads and trails where gas lines are located throughout the Installation properties. The Contractor shall notify the Fire Department by telephone or radio, within 5 minutes after the Contractor's discovery or notification that there is a gas leak or a suspected gas leak. The Contractor shall use approved gas leak detection equipment and shall maintain this equipment in peak operating condition at all times for the detection and location of gas leaks.

5.4.4.8.1 Gas Line Inspection. The Contractor shall provide personnel to accompany an independent contractor on an annual inspection of all gas lines located on the Installation. The Contractor shall be responsible for making the necessary, repairs determined by the class in accordance with 49 CFR 191 and 192.

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